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ARIZONA SACRIFICES HER PREHISTORIC CANALS¹

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What now remains of the justly famous prehistoric canals of the Salt and Gila river valleys, Arizona? To answer that question for the Bureau of American Ethnology I paid a hasty visit to the areas in question in mid-September, 1929.

Most of us are prone to forget that what formerly comprised the the most extensive irrigation projects in the Americas, if not, indeed, in the whole world, were undertaken by primitive farmers of south-central Arizona. No where else, so far as I am aware, had similar operations on so vast a scale been attempted prior to the present era of steam shovels and drag-line dredges.

In 1893 Mr. Frederick W. Hodge, formerly of the Smithsonian Institution and a member of the Hemenway Archaeological Expeditions of 1886-8, wrote: ". . . the principal canals constructed and used by the ancient inhabitants of the Salado valley controlled the irrigation of at least 250,000 acres . . . at least 150 miles of ancient main irrigating ditches may readily be traced, some of which meander southward from the river a distance of 14 miles."²

Less trustworthy observers have even doubled the above figures; on the basis of the acreage supposedly cultivated, have estimated a prehistoric population as high as 200,000. Now the value of such estimates varies directly with the experience and qualifications of the individual reporter. Numerous factors must be taken into consideration. Not every passerby can view the divers works of prehistoric man with the calm impartiality of the trained archeologist. For my own part, I have no first hand opinion to express as to the original number and extent of Arizona's ancient canals. They were mostly gone when I went to see them. And most of the references pertaining to them do raise doubts of one sort or another.

But let us assume that Mr. Hodge is substantially correct. One hundred and fifty miles of canals averaging seven feet deep and thirty

¹ Photographs by courtesy of the National Geographic Society.

² Prehistoric Irrigation in Arizona. *The American Anthropologist*, Vol. 6, No. 3, pp. 323-330. Washington, 1893. Earlier references to this subject are noted by Dr. O. A. Turney in a continuing article, "Prehistoric Irrigation," published in *The Arizona Historical Review*, Vol. 2, 1929.



FIG. 159.—One of the prehistoric canals preserved by Phoenix, Arizona, in its Park of the Four Waters.



FIG. 160.—An ancient canal, at the upper right, was bisected by Salt River long before the Swilling ditch, in the foreground, was dug about 1868.

feet wide is no mean achievement for a primitive people without beasts of burden; with no excavating equipment other than stone and wooden implements. We have as yet no certain knowledge as to just what Indian groups accomplished this stupendous task but we do know, from archeological deductions, that the work was done by hand and that small baskets were the most likely containers employed in the removal of excavated material.

If, as contractors insist, a husky laborer can pick down and shovel into waiting cars 12 cubic yards of loosely-cemented gravel in an eight-hour working day, then anyone so inclined may figure the time



FIG. 161.—Pima children, no doubt, had constructed a pebble maze on the floor of Canal Fourteen during the summer of 1929.

involved in the construction of the Salt River valley canals. I have not done it for several reasons; for one, I have no statistics on the relative efficiency of an eight-pound steel pick and a river cobblestone, sharpened by the flaking process and used as a grubbing tool. But I do know the average Indian farmer of the Southwest is at his self-appointed tasks from sunrise to sunset when necessary and I know, further, that same Indian will accomplish more in his own behalf than he will for any employer. With stone and wooden tools; with baskets as precursors of wheelbarrows, the native populations of the Salt and Gila river valleys performed tasks the very magnitude of which astonish us of a mechanical age.

Arizona's prehistoric canals were not individual enterprises. Entire communities joined hands to achieve that on which their very existence depended. By preference, these folk were farmers in a desert environment. They waged a constant struggle against seemingly insuperable odds; asked no favors; required no cornucopia for contentment. But without successful harvests their immediate future loomed darkly; without water, food crops could not mature; without canals, water could not be conveyed to fields suitable for cultivation. Canals meant water and water meant life. Hence those man-made ditches that reached into the river channels with flimsy brush and stone dams and meandered down valley long miles to isolated villages whose dun adobe dwellings clustered about a massive edifice of thick, earthen walls.

In 1926 Dr. Byron Cummings, Director of the Arizona State Museum, surveyed 40-odd miles of ancient canals in the Gila River Valley; in 1922, Dr. O. A. Turney, of Phoenix, published¹ his map of the still larger canal systems bordering the Salt River. These timely surveys must find place among our permanent records. They cannot be repeated and it is already too late to check them for possible error. The old canals are mostly gone now, a sacrifice to agriculture and to urban development. Modern homes and office buildings; cotton fields, vineyards and acres of lettuce have recently spread over garden plots where primitive folk cultivated maize, beans and squashes.

Monster dams, named in honor of two ex-presidents, have been raised to impound flood waters which are thereafter equitably distributed, even during the hot dry months, to ever thirsty fields. Newly dug ditches often follow their untimed predecessors in wide curves across the gentle, cacti-covered slopes of the valley. The recent, remarkable increase in population of Phoenix and its neighboring communities is basically owing to a fairly constant water supply conveyed by this far-flung network of modern canals and the consequent, successful cultivation of desert soil.

But this expansion, this evidence of industry has brought with it almost complete obliteration of the prehistoric irrigation systems. These latter made possible the first real civilization in Salt River Valley—a native Indian civilization based on agriculture in which the entire community directly participated. Of the 230 miles of ancient

¹ The Arizona Republican, Phoenix, November 22, 1922; reproduced in "The Land of the Stone Hoe" (Turney), 1924, and in the Arizona Historical Review, Vol. 2, No. 2, 1929. The map supposedly includes the earlier surveys by C. A. Garlick, of the Hemenway Expedition, and that of H. R. Patrick, published in Bull. 1, Phoenix Free Museum, 1903.



FIG. 162.—Near its present junction with Salt River, Canal Fourteen measures 8 feet deep with a maximum width of 66 feet.



FIG. 163.—Greasewood and catclaw offer no obstacle to the giant grading machines employed on the San Carlos project.



FIG. 164.—Pima houses are usually built of suhuaro cactus ribs, plastered with mud. When their water supply fails, the Pima move.

canals represented on the Turney map, I venture the guess that less than ten per cent are now traceable. And these only because the tractor and the gang-plow have not yet reached them.

In its Park of the Four Waters, the city of Phoenix has happily preserved remnants of three old canals. Eleven miles to the east there remains another magnificent section (fig. 162); vestiges of still others may be seen, if they have not been leveled and plowed over since last September, north of the Sierra Estrella, some 13 miles southwest of Phoenix. Other sections survive here and there but chiefly on Indian lands. The brush and stone dams that originally turned the river current into these ditches were lost with each passing flood; their very sites have since been washed away as the river widened and deepened its pebbled channel. In every instance, I am reasonably sure, the old canals now open their thirsty mouths at least 10 feet above the present water level (fig. 160). But this fact does not of itself necessarily indicate an age of more than 10 or 12 centuries for the canals.

The 50 major buildings and the uncounted lesser structures that Cushing called Los Muertos in 1887 have gone to fill the several old ditches he saw nearby. No trace remains today of this once populous and important settlement. Where it formerly stood, contented cows now munch in green meadows. And what is true here is generally true elsewhere throughout the Salt River Valley.

On the Pima Reservation, south of the Gila, 56,000 acres of virgin land were being prepared in 1929 for Indian farmers. As I happened by, giant tractors were pulling mesquite trees out by the roots; were raking, grading and smoothing the sandy soil at the rate of 20 acres a day. Of the several prehistoric canals which crossed these new fields a year ago, one dim meandering channel alone remained. It, too, was doubtless wholly erased within a few days. Here the engineer is justly proud of the efficiency with which his snorting machines perform; of the speed and sureness with which a colossal undertaking is being consummated. What is past, is past! Lingering vestiges of a prehistoric civilization from which the entire nation might learn are wiped out, destroyed, with a wave of the hand. Like those of the Salt River Valley, the ancient canals bordering the Gila have mostly been sacrificed to twentieth-century hopes. A generation hence, some vague tradition may prevail among the Pima and Papago of vast ancestral canals through which Arizona's formidable deserts were first temporarily vanquished.

Each succeeding civilization builds on the remains of its predecessors!

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